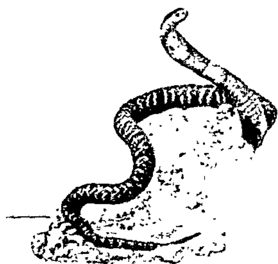


INTRODUCING

poisonous SNAKES

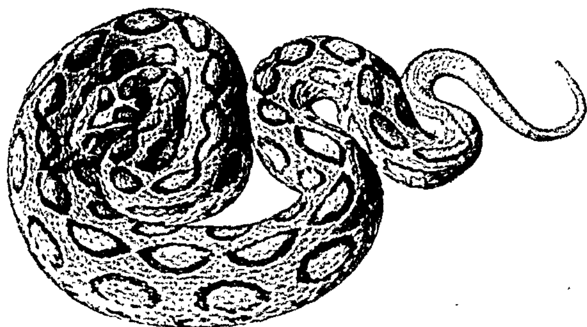
by V. J. Staněk

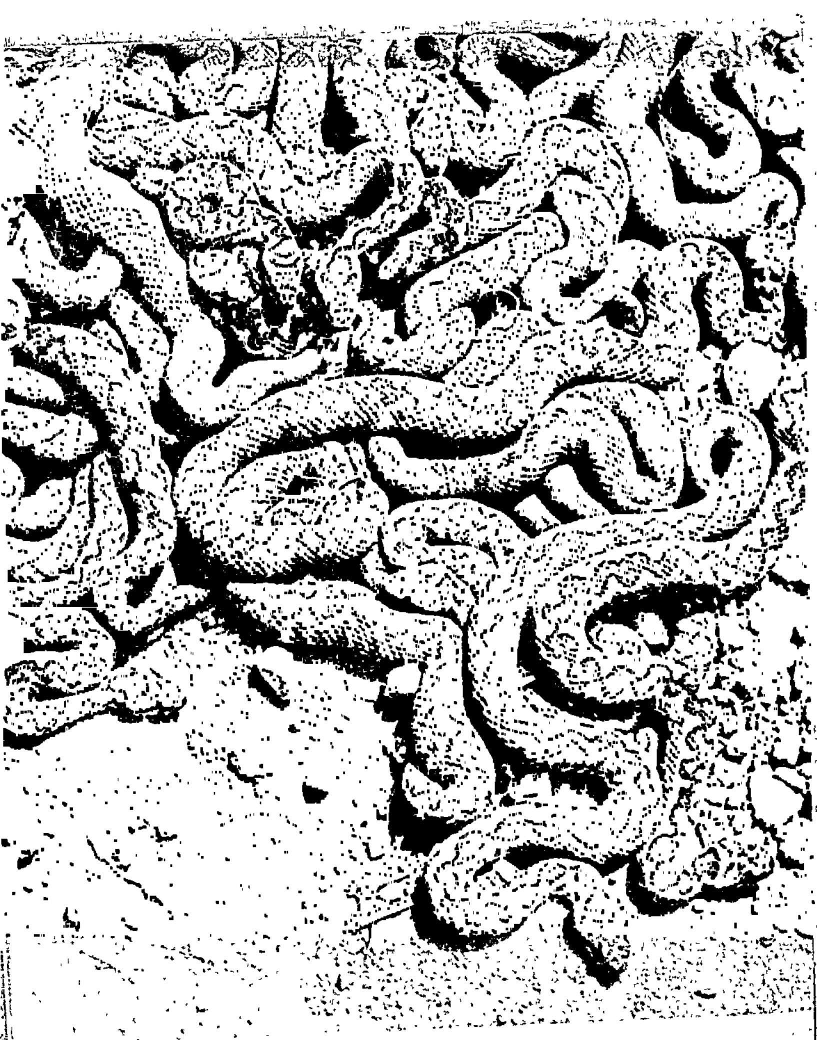
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INTRODUCING POISONOUS SNAKES

A cluster of poisonous snakes! How does the picture affect us? If we imagine this mass of interwoven bodies to be alive before us, writhing and undulating, with the heads raised, and forked tongues flicking from their jaws—we experience a shudder of fear and revulsion.

Only experts seem exempt from this common dread of poisonous snakes. Instead of recoiling in involuntary disgust, as we do, these students are actually prepared to move closer to the writhing bundle of snakes, observing them with detached scientific interest.

Man's hostile attitude towards snakes is rooted in immemorial experience. An encounter with certain kinds of venomous snake almost invariably spells death—dreadful, unexpected death — if no treatment is immediately available, and the days when nothing could be done to remedy the effects of snake-bite are not so far gone by.

An element in our fearful distrust of the snake is its capacity for self-concealment, which makes possible its unexpectedness of attack. Some kinds of snake, such as the African Mamba, the Brazilian Bushmaster, and the South Asian King Cobra, are still objects of terror to the inhabitants of the regions where they are found. It is possible of course for the traveller moving through snake-infested country to protect himself against snake-bite: by constant vigilance, and also by suitable dress, as for instance the wearing of knee-high boots. Special first aid equipment should always be carried; for if a man, in spite of all precautions, is bitten by a snake, even a deadly one, death is not unavoidable these days. Modern serums can effectively combat the effects of dangerous snake-bites which formerly were fatal.

These serums are the result of many years of difficult and sometimes dangerous research. They are known as 'Anti-venins', and for their production large quantities of venom are needed. The venom is drawn from snakes that are kept in captivity.

In the tropics there are a number of famous institutes devoted to the study of snakes and the production of serums. In some of these are hundreds of snakes of different varieties, which live on grassy portions of land surrounded by trenches. In other institutions the snakes are kept in glass cages.

Whatever the method of accommodating the snakes, the people who look after them obviously need to be unafraid of them, and they must be able to treat and handle them gently. Apart from these institutes there are quite a few private snake breeders, who keep snakes for pleasure; some of these breeders are very successful, their snakes even multiplying in captivity.

If properly handled — that is to say, with great care and gentleness—some venomous snakes live for many years in confinement But they always remain dangerous charges, who are ready at all times to use their deadly weapons. A split second's unwariness — and death may strike. The danger is so great with certain types of tropical snakes that only a highly experienced and cautious keeper, able to concentrate fully on what he is doing, can safely look after them.

In Europe the danger of snake-bite is limited to the common viper. In spite of the fact that people usually kill this snake at first sight, it is still quite common in some more remote countries The viper will bite only in self-defence; for instance, when some-

one treads on it, touches it or comes very close to it. When alarmed the snake uncoils swiftly, shooting the front third of its body forward, and striking the unlucky intruder with the fangs which are situated at the front of its upper jaw.
A number of cases of poisoning due to bites from vipers end in death because the victims have not been able to obtain medical treatment in time. An anti-venin serum injection, to be effective, has to be administered not later than four hours after the bite. Prevention, of course, is the best cure for snake-bite; and this obviously means using the greatest caution in places where vipers are thought to be present.
If we remember that the viper lives chiefly on mice, it must be admitted that it is a relatively harmless creature. Fortunately for us, the viper has many enemies in the animal world—hedgehogs, wild boars, storks, herons, and other birds of prey — which serve to reduce their number. In remote areas away from human habitation, they form an integral part of natural life. It is a good thing that they have survived in such places, even if only to enable zoologists (more specifically, herpetologists) to catch live material for their observation. A live snake in the hands of an expert is far more valuable from the scientific point of view than a dead one, encountered and killed on the road.

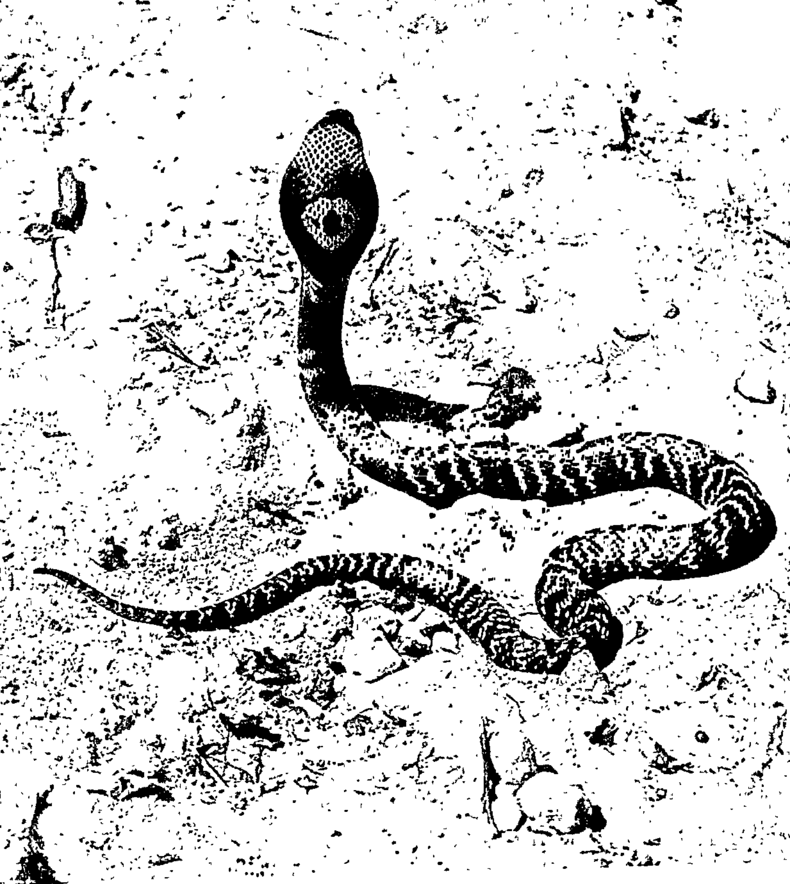
In Africa and Asia there live a number of kinds of cobra. They all have one dangerous feature in common: when not annoyed, they resemble the innocuous (though stronger) colubrine snakes to be found in Europe. They have a similar ovoid head and a lithe, nimble body. Even the best known of the cobras — the Spectacled Cobra or *cobra de capello* (*Naja naja*) — has the appearance of a harmless snake when not annoyed or disturbed.



Only when frightened or annoyed does the cobra lift its body and expand its hood. This menacing effect is produced by the motion of the first eight or so pairs of ribs which the snake erects and extends to both sides. At the same time the skin covering these ribs, which is normally wrinkled, stretches, and a weird design is revealed on the upper side of the hood, resembling a pair of spectacles

The *cobra de capello* grows to a length of up to five-and-a-half feet, and in the erect position described it looks most threatening. It is a very lively snake, highly sensitive to its surroundings. It reacts briskly to all stimuli, vehemently turning its head in the direction from which provocation comes, inflating itself, hissing and striking with its head against the intruder.

Man's dread of the cobra is well founded. A single bite of this snake contains a large amount of venom, which paralyses the nervous system, sufficient to kill up to fifteen people! This is why Indian conjurers and snake charmers who perform with cobras arouse such interest and admiration. These performers are usually patient, shrewd individuals, with a detailed knowledge of the make-up of snakes, who can quickly anticipate the lightning changes of mood in their charges. Some of them work without any risk, however, depriving the snakes of their fangs in advance or even sewing up their jaws. Indian Brahmins worship cobras as if they were gods.



Genuine cobras live in India. In the East, in the Indo-Chinese peninsula, there lives another subspecies, the Monocled Cobra, *Naja naja kaouthia*, which has a circular pattern on its body, usually with a couple of patches.



A full-grown cobra hardly ever bites a human by day. The greater proportion of deaths is due to the victim treading on the snake with bare feet at night. The cobra is often blamed for deadly bites which in reality are the work of the dangerous Daboia or Russell's Viper. Like the Common European Viper, the cobra goes hunting chiefly at dusk or at night. Its food consists of small vertebrates: birds, lizards, snakes and frogs. When in pursuit of its prey the cobra often penetrates into gardens and the ground floors of houses.

In the system of snakes the cobra belongs to the venomous *Proteroglypha*, of the family of elapid snakes They are related to the American coral snakes and the African Mambas. To the west of India, in Persia, Afghanistan and in the south of Soviet Central Asia there lives another subspecies, the Central Asiatic Cobra, *Naja naja oxiana* It is usually without patches on its body, being of an inconspicuous yellowish-grey colour without any trace of a design on its neck Instead there are only wide transverse stripes which differentiate it from other snakes of a similar colour. It grows to a length slightly exceeding three feet, and has an even calmer nature than its Indian relation. In Soviet reservations it is protected.

On the islands of the Malay archipelago there lives the Spitting Cobra, *Naja naja sputatrix*. This snake squirts its venom at its victim by compression of its poison glands, which forces out the venom through its fangs; it can hit its target at distances of over three feet. This method of attack is common to several kinds of unicoloured cobras, some of which resemble in appearance the Central European colubrine snakes. They live in East India and in Africa. Some species are very difficult to distinguish from one another.

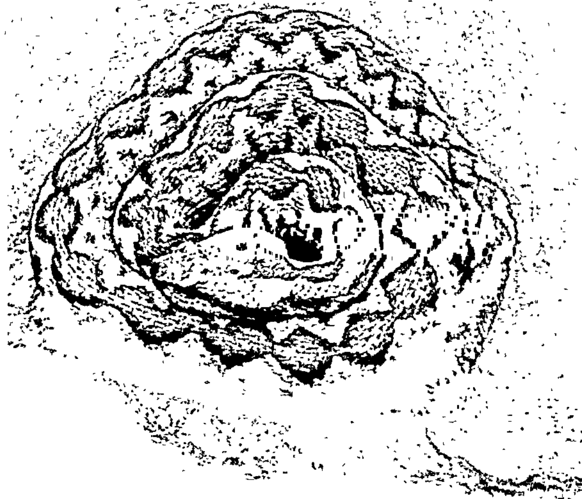
The biggest venomous snake in the world is the King Cobra or Hamadryad. Even though it may grow to a length of as much as sixteen feet, its colour being yellowish green with black stripes. It is one of the most dangerous creatures on earth, being aggressive and considerably [illegible]. Its habitat is on the coast of China, [illegible], Burma, Malaya, and the Philippines, and it lives mainly on other snakes. From [illegible] of plants [illegible] [illegible] a nest for its eggs and will attack any creature that approaches them.



In east Asia, India, southern China, Sumatra and Java there lives a beautiful but deadly venomous snake called the Pama, or Banded Krait, *Bungarus fasciatus*. Its body is about four and a half feet long, yellowish-brown in colour and of a triangular cross section, decorated with black or brown-black stripes. The Krait lives usually in dry places, but it can swim excellently, like the cobra. Its food consists usually of small mammals and frogs and it hunts only at night. In the daytime it very frequently hides in human dwellings It bites only in self-defence; its bite is dangerous, however, because, like the cobra, it has relatively short fangs. When biting, these snakes 'chew', i. e. bite several times into one place, so that the wound receives a large dose of venom

In the open bushy regions of South and South-East Africa there lives a small snake (about one and a half feet long) with relatively large eyes, either greenish or brown in colour. It is the Boomslang, *Dispholidus typus*. It ranges among the bush snakes, the Boiginae subspecies, which are provided with fangs, but since these are set far back in their jaw, they are practically harmless to man. Among all members of its family only this snake must be considered deadly venomous. It climbs trees easily as well as the bushes of the grasslands, hunting for frogs, chameleons and young birds.





A typical family of venomous snakes are the vipers, *Viperidae*. We do not know of one innocuous snake belonging to this species. Unlike the venomous *Proteroglypha*, particularly the cobras, they are at a far lower stage of development as far as their intelligence is concerned. With regard to their bodily characteristics they are more advanced, and particularly is this true of their fangs. *Proteroglypha* have short fangs, solidly embedded in their upper jaw. The fangs of viperine snakes are far longer, so that they have to fold them backwards as they close their jaws. Only when the jaws are opened do the fangs stand up.

In south-east Europe and adjoining Asia Minor there lives a beautiful snake, the Sand Natter, *Vipera ammodytes ammodytes*. Big individual specimens attain a length approaching three feet. Their colouring is very varied, ranging from greyish-brown, brownish-red, and greyish-red to various shades of black and white, being in rare cases, even dark. At the tip of its snout the snake has a horn consisting of small scales. By this horn the Sand Natter can be distinguished at first sight from the Central European Common Viper.

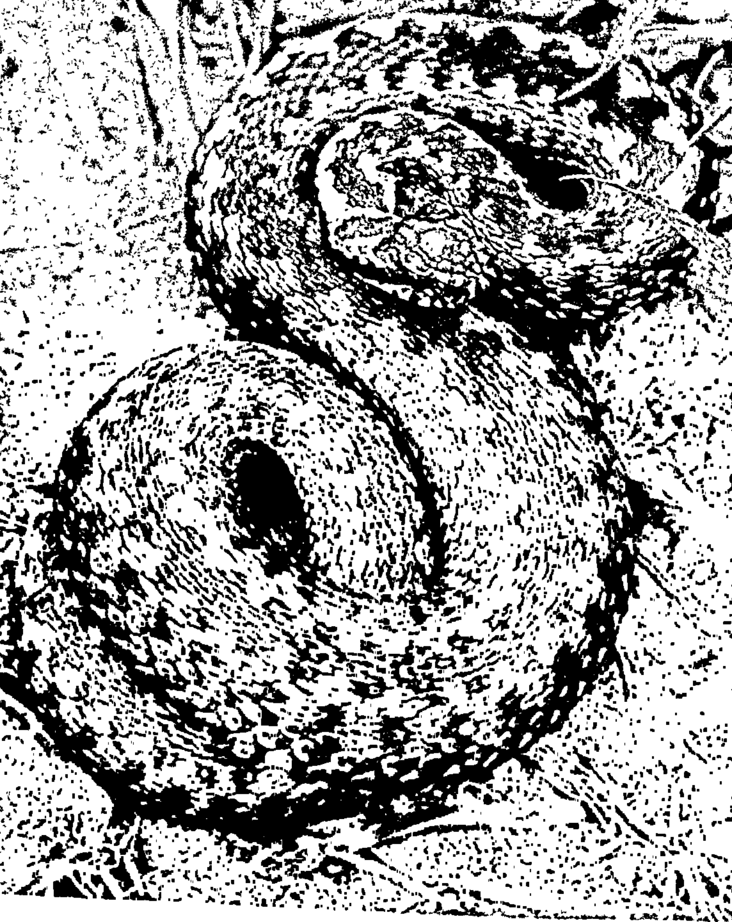


The Sand Natter lives chiefly in rocky regions, inhabiting in some cases even heights of over 3,000 feet above sea level. Mountain clearings, sunny valleys and rocky slopes are its habitat. It hunts sometimes in the daytime, but mainly at night, for its food which consists chiefly of small mammals and birds. After having bitten them, it gnaws small mammals until they are dead. On catching a small bird, it holds it in its jaws until it is completely paralysed. At the top of this page can be seen the head of a male with the horn tilted obliquely forwards. At the bottom of the opposite page there is seen a representative of a subspecies, the *Vipera ammodytes montadoni*, the horn of which is erect and exactly upright. It is found chiefly in Bulgaria.



The heads of all viperine snakes can be readily distinguished from those of the colubrine snakes The scales at the sides of their forehead form a straight, protruding shield above the eye, thus giving the eye a somewhat villainous aspect. The pupil of the eye is cat-like, having the form of a vertical slit narrowed from the sides The upper photograph shows the head of a Sand Natter.

At the bottom of this page and on the opposite page there are pictures of the Common Viper, *Vipera berus*, characterised by the typical pattern on its back. The continuous zig-zag stripe down the back is typical of several European vipers, its more or less visible outline being seen even on the backs of some harmless colubrine snakes. On being examined carefully, however, this snake can be safely separated from the others, its characteristic mark being two dark stripes crossing each other in the shape of the letter X on its neck. This pretty snake lives mainly in rocky and woody regions, in moist, but sunny clearings, in pastures, in piles of stones among fields, in bogs and on stony slopes. Its habitat extends from Central Europe to the north, as far as the Polar Circle.



The Common Viper [illegible] a length of [illegible] feet [illegible] full grown specimens [illegible] [illegible] as much as three feet long.

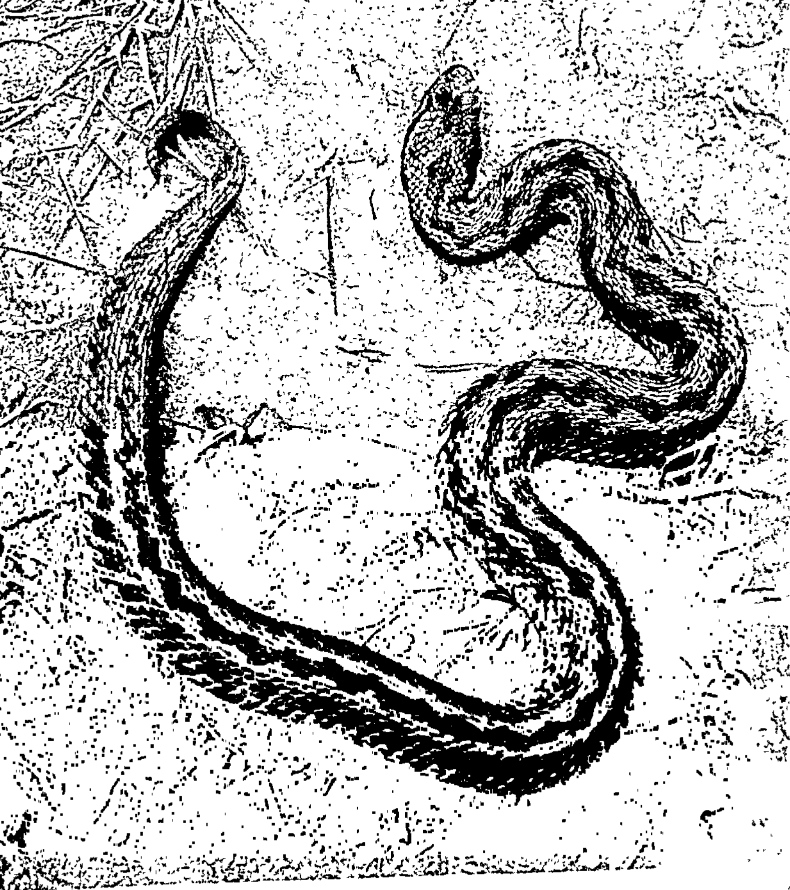
The colouring of the Common Viper is so varied that it is hardly possible to find two specimens of the same appearance Also reliable identification of the Common Viper in relation to other species is quite difficult. The slit-like pupil in its eye constitutes its only characteristic for the layman. Some specimens are almost black, with yellowish-brown markings at the sides of their heads

The Common Viper mates at the end of April, and in August or September the young are produced. Their number may be as high as fifteen.

Does the female Common Viper lay eggs or does she produce living young? This frequently asked question can hardly be answered in one word. When being born the young snakes are usually enclosed in membranous sacs, which are actually eggs. As a rule, however, the young ones leave the sac almost immediately after being laid. Sometimes it happens that the young snakes are born prematurely, while in other cases their birth is overdue, so that they break loose from their sacs by themselves while still in the mother's body. In the picture on the left you can see the young of the Common Viper in their sacs, while the picture on the right hand side shows them after they have broken loose (magnified about twice).



In dry, warm [illegible] of southern Europe there lives the third European kind of viper, the Asp Viper, [illegible] broader than the Common Viper and the front part of its snout is turned slightly upwards. The [illegible] [illegible] stripes.



South-east Europe and the steppes of Central Asia are the habitat of the small Steppe Viper, called Orsini's Viper or Renard's Viper, *Vipera ursinii, v. renardi*. It is smaller than the Common Viper from which it differs only by small variations in the head shields. Its food consists mainly of rodents and lizards.



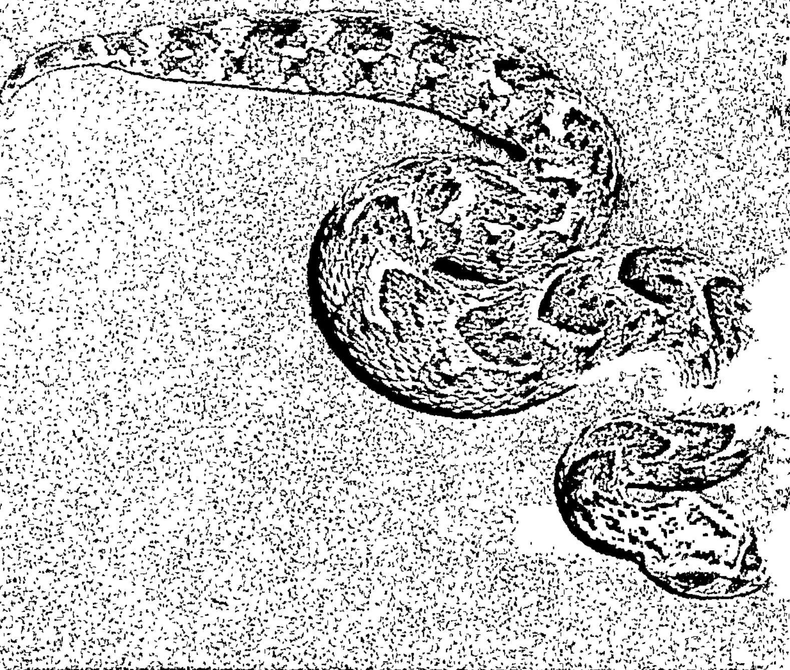
In the coastal regions of Asia Minor, Palestine and Syria, there lives the beautiful Coastal Viper, *Vipera xanthina*, which attains a length of four feet. On its back it has a stripe consisting of dark brown rhomboids bordered in black. The colours of its head and neck are more lively than those of the remainder of its body.

In the countries beyond the Caucasus, particularly in Armenia, there lives a similar species of viper, characterised by a light, reddish pattern on its back and by raised scales above its eyes resembling small horns. This species is called the Armenian Viper *Vipera raddei*.

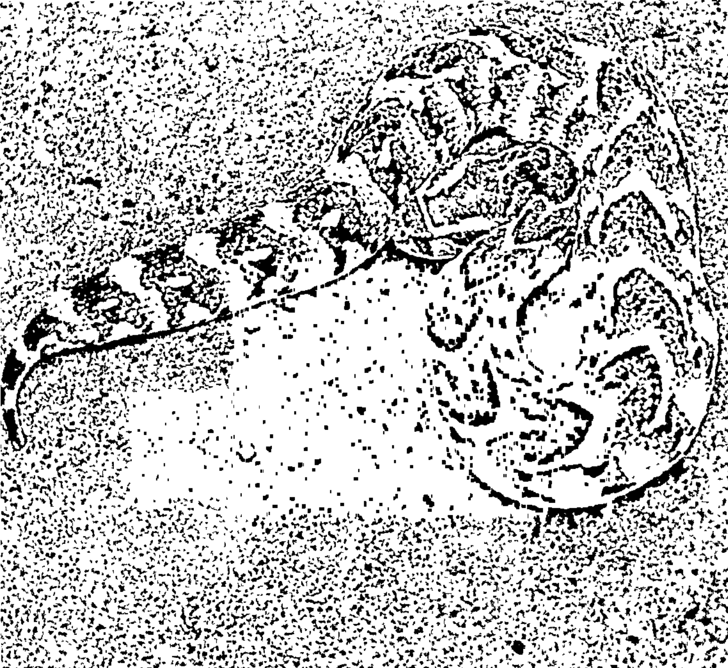


The blunt-nosed Levantine Viper, *Vipera lebetina*, attains a length of five feet and a weight of several kilograms. It lives in North Africa (with the exception of Egypt), in Syria, Israel and eastwards as far as India. It is very difficult to discern in the open, being grey, greyish-brown to olive-green in colour. In Central Asia *it is known under the Russian name of Gyurza*

At the bottom of this page and on the opposite page there are pictures of the tic-polonga, or Russell's Viper, *Vipera Russelli*, formerly called also *Daboia elegans*. This snake attains a length of six feet and has a yellowish-brown body with three rows of oval, reddish-brown patches bordered in black and white. It is one of the most beautiful, as it is also one of the most dangerous, snakes. It is widely spread in India and the neighbouring countries and in the Malay archipelago.



African viperine snakes of the family *Bitis* have a short and thick, almost bloated body. The genus includes several species, all of which are beautifully coloured. The Puff Adder, *Bitis arietans*, is decorated with light yellow, crescent-shaped patches across its body the colour of which is dull grey or brown with darker and lighter tinges. It attains a length of almost five feet, and is found south of the Sahara, extending, however, as far as Morocco and Arabia. It lives in open regions, remaining coiled up under the vegetation in the daytime and hunting at night. It is a very vicious and dangerous snake, although it is said that native children sometimes play with it.



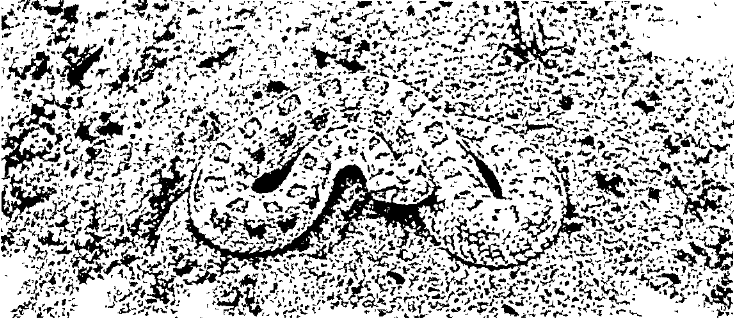
The fangs of the snakes of the family [illegible] are sometimes as much as two inches long, this being ten times the length of the cobra's fangs. These long 'injection needles' transfer the venom deep into the flesh of the victim. It is interesting to note that the snake utilises its fangs also for pushing its prey into its throat. It is really remarkable how agile this snake is when striking its prey in order to bite, although it appears to be resting lazily and motionless. The protective colouring of the snakes of this family and of those of a similar species is so perfect that one can almost touch the coiled snake without ever seeing it.





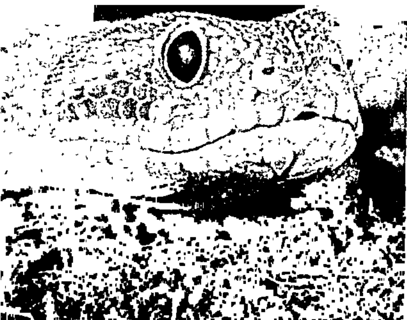
The eyes of the Puff Adder occupy an exceptionally forward position in its triangular head. Like all viperine snakes the Puff Adder has a cat-like pupil.

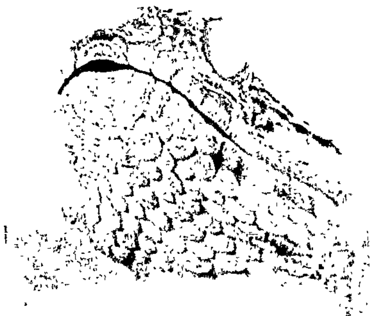
Some of these 'toads' among snakes have one or several horns on their snouts or above their eyes. A specially small species of this family, the so-called Horned Adder *(Bitis caudalis)*, with a row of square, brownish-red patches on its back, has a sort of small brush above each eye, formed of pointed scales, from which a small pointed horn protrudes.



This is an interesting small venomous snake which moves in the sand in a peculiar manner. It does not crawl forward as do the majority of snakes, but glides sideways.

The beautiful Carpet Viper or Saw-scaled Viper, *Echis carinata*, also slides along the sand—and in a manner which is unique. It winds the whole of its body, which is coiled into three interlocking loops, continuously in one direction, without uncoiling





The eyes of this snake are placed a great deal towards the front part of its head. Between both jaws can be seen the channel through which the snake flashes its sensitive forked tongue, while keeping its jaws closed. In the Central Asiatic regions of the Soviet Union this viper is called 'efa.'



The habitat of this viperine snake includes the sandy deserts of Central Asia and India. The snake is, however, found also in North Africa and in some localities of Central Africa. In length it more or less equals the Common Viper. When inflated with air it seems to be much bulkier. It moves very quickly and is always ready to strike. When moving, it rubs the sharp scales of the adjoining loops of its body against one another, producing a strong, sharp sound similar to hissing, but much more expressive. This agile and very aggressive snake with relatively long fangs and very effective venom is one of the most dreaded snakes known to man.



The slit-like pupil of the Carpet Viper is very sensitive to light, like the eyes of all viperine snakes in general. In the dark it extends to the shape of a circle, contracting to a mere slit in the light. According to this reaction one can tell whether a motionless snake is dead or alive

In the wet regions of the tropics there lives a particularly large number of snakes. They hide in the green foliage of giant jungle trees, often merging with the winding stalks and stolons of the lianas The Bamboo Pit Viper, *Trimeresurus gramineus*, with a prehensile tail, is green on top and bright yellow underneath. It is a relation of the American rattlesnakes and lives in the jungles of India and of the Malay archipelago.

In African jungles there live similar venomous snakes allied to the terrestrial viperine snakes of the family *Bitis*. These are called Arboreal Vipers and belong to the genus *Atheris*. Their length does not usually exceed three feet. The Palm Viper, *Atheris squamigera*, of the Congo has inconspicuous grey colour and large, coarse scales which give it the appearance of a rough, dry twig





The Wagler's Pit Viper, *Trimeresurus Wagleri*, is a black and yellow [illegible] wide head It lives among bushes and trees [illegible] small arboreal vertebrates. Its venom, [illegible] snakes, is not deadly to man. This snake is by nature rather mild. For this reason the natives sometimes transfer it to trees in the vicinity of their dwellings, believing it to bring good luck.

On the other hand, the allied genera of *Bothrops* and *Lachesis* of Brazil and neighbouring countries are among the most dreaded terrors of the South American forests. They have the powerful resilience of steel springs, and are provided with long, deadly fangs. When fully grown they attain a length of only about six feet, the one exception being the world-famous Bushmaster, *Lachesis muta*, which grows to the giant length of nine feet or more. Our picture shows the species called Jararaca, Maximilian's Viper, *Bothrops neuwidii meridionalis*, of Argentina.

The lower picture is a photograph of another species, the *Bothrops alternatus*, commonly called urutu.





On the opposite page there is a picture of the *Bothrops alternatus*, with a beautiful pattern composed of crescent-shaped patches. It is about five feet in length and its bite is deadly to man. Its habitat includes the south of Brazil, Argentina, Paraguay and Uruguay.

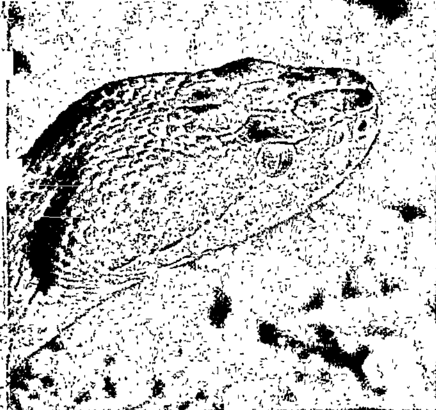
In America there live a great many deadly venomous snakes allied to the rattlesnakes. The swamps of Florida and the adjoining regions of North America as well as banks of lakes and rivers swarm with snakes which are the terror of the countryside. They include the Water Moccasin, also called Cotton-Mouth Snake, *Agkistrodon piscivorus*. They are dreaded for their viciousness and excitability. They grow to about five feet in length and are practically omnivorous, feeding on fish which they catch in the water, as well as on frogs, small mammals and birds, which they hunt on the banks of swamps and rivers.



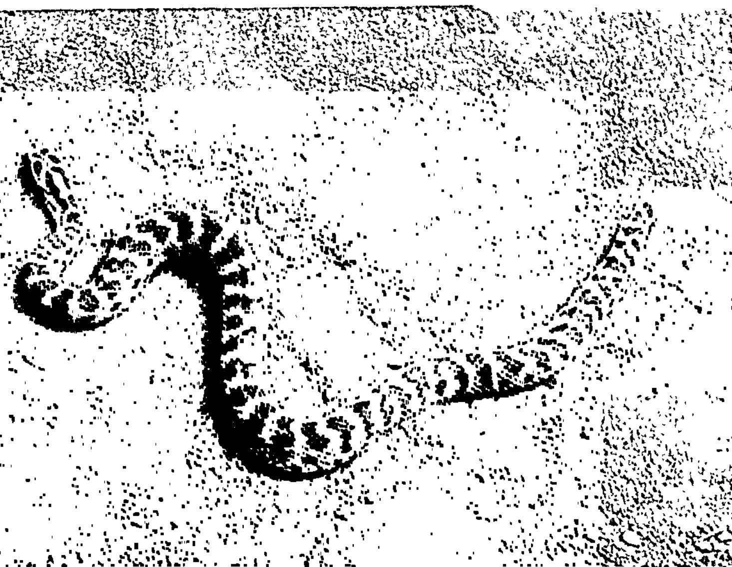


The opposite picture shows a fully grown Water Moccasin of a very dark hue, except for a brownish-yellow pattern on the lower part of its head and its light belly. The young of this snake are bright brown in colour.

In deserted localities of Central America and Mexico there lives a somewhat smaller species, the Mexican Moccasin or Cantil, *Agkistrodon bilineatus*. Young specimens are ginger-red, while old, fully grown snakes are almost black, with a white pattern on their head and body. The Mexican Moccasin is smaller than the Water Moccasin, but it is even more excitable and more venomous than the latter, being therefore also more dangerous Both pictures show fully grown snakes



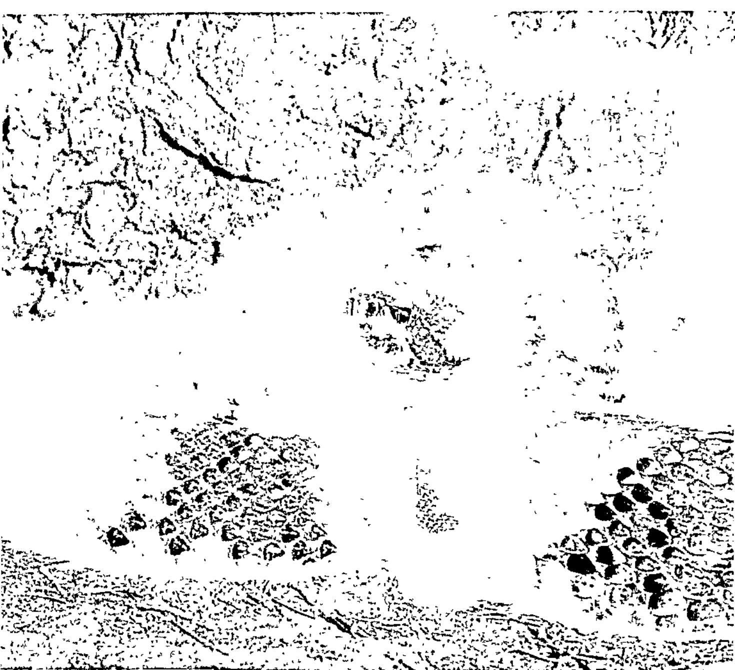
In the eastern states of the United States of America there live several geographical species of Copperhead Snake, *Agkistrodon contortrix*. Its colour is light brownish-red, as though it were made of pure copper. Although not so deadly venomous as the rattlesnake, it is greatly feared because of its agility. American Moccasins produce up to ten young in one brood, while some rattlesnakes bear as many as seventy young in one brood.



The Moccasin Snakes live not only in North America, but also in Asia, where the number of their genera is three times as large as in America. The habitat of one of these nine Asiatic Crotaline snakes extends from the south-western regions of the Soviet Union right into Europe (e g the Siberian Moccasin, *Agkistrodon Halys caraganus*). When excited, it vibrates its tail in the manner of American rattlesnakes, thus producing a weak, chirping sound, which is, however, amplified through contact with surrounding objects Similar behaviour can be noticed in the American Moccasin Snakes, for instance, the Water Moccasin, which, by vibrating the end of its tail, whirls the water in such a manner that it can be heard at a considerable distance. The Siberian Moccasin, called in Russian *shitomordnik*, is quite abundant in some localities of the Asiatic part of the Soviet Union. In the steppes it hunts minor vertebrates in the same way as the Common Viper in Europe, resembling this snake also in size Its bite has serious consequences and involves lengthy treatment even in cases where a serum is administered in good time.



In the south-east territories of the United States there lives a small venomous snake hardly one and a half feet in length. Its body is greyish in colour with a row of reddish-brown patches on its back and it is provided with a small, miniature rattle It is known as the Pigmy Rattlesnake, *Sistrurus miliarius*. In some of its anatomical characteristics it differs slightly from the true rattlesnakes, being, however, very similar to them in its general appearance. Its rattle has a rather weak, bell-like sound, which can be confused easily with the chirping of insects. Usually its bite is not deadly, but it has unpleasant consequences resulting in lengthy, often chronic illnesses.



Of the number of species of the true rattlesnakes, all of which live only in America, the Diamond-Back Rattlesnake, *Crotalus adamanteus*, is the largest and the most deadly. It is found in the south-east territories of the United States and grows to a length of over seven feet. It lives in dry deserts and rocks, where it feeds on small mammals, particularly rodents. It does not, however, shun moist regions, and can swim excellently, too.

The rattlesnakes are the most feared snakes of North America. Their bite is deadly in the majority of cases when help in the form of a suitable serum and further treatment is not available in good time. Contrary to 'mute' South American venomous snakes, which bite suddenly, without warning, the rattlesnakes are less dangerous, usually warning the approaching intruder with their rattle, which emits a clearly audible sound

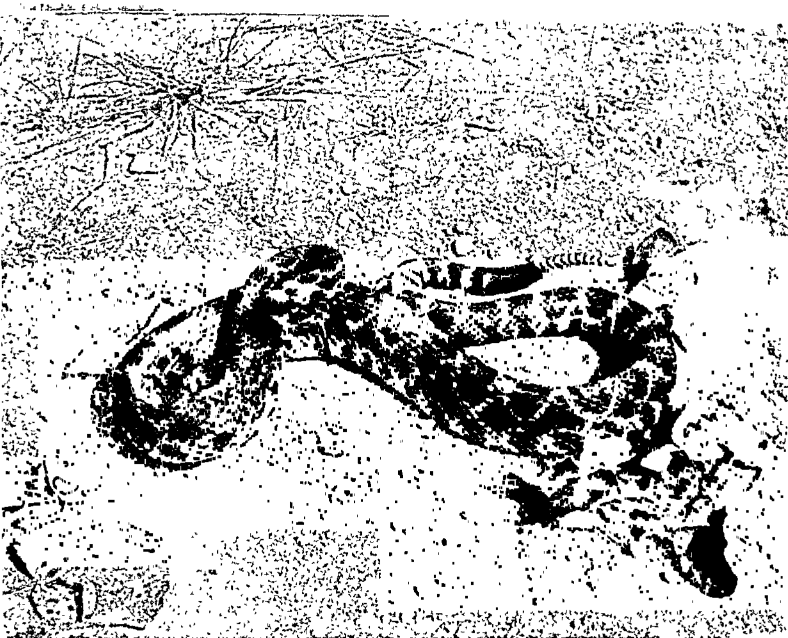
On the deserted coasts of south-west California there lives the Red Rattlesnake, *Crotalus ruber ruber*, of a beautiful, reddish-brown colour. Its tail is striped in black and white like its relation, the Diamond-Back Rattlesnake. The Red Rattlesnake is not as big, attaining a length of a little over four and a half feet. The colouring of this snake is sometimes so close to that of its surroundings that its tail cannot be perceived at all. It can be spotted only when it begins to glide or rattle. Sometimes it happens that a rattlesnake bites without warning. This may occur when the snake is surprised very suddenly, so that it does not have time to express its annoyance by rattling.
This snake is almost deaf, being sensitive only to vibrations along the ground. Its eyesight is not very good, either. It is capable of discerning moving objects at a maximum distance of about fifteen feet only.

The Timber or Banded Rattlesnake, *Crotalus horridus*, is found in several geographical subspecies almost all over North America as far as the Mexican Gulf. On a greyish-brown base this snake has a row of wide, transverse black stripes. It is a little over four and a half feet in length



The Prairie Rattlesnake, *Crotalus viridis Helleri*, is found in south-west California. Further geographical subspecies live in North Arizona, Oregon, east Utah and the adjoining states. Its basic colour is generally dark, its pattern having an orange or greenish hue. Its tail is not decorated with black bands.

On the opposite page you see this rattlesnake in its defensive position which is at the same time its position for attack.



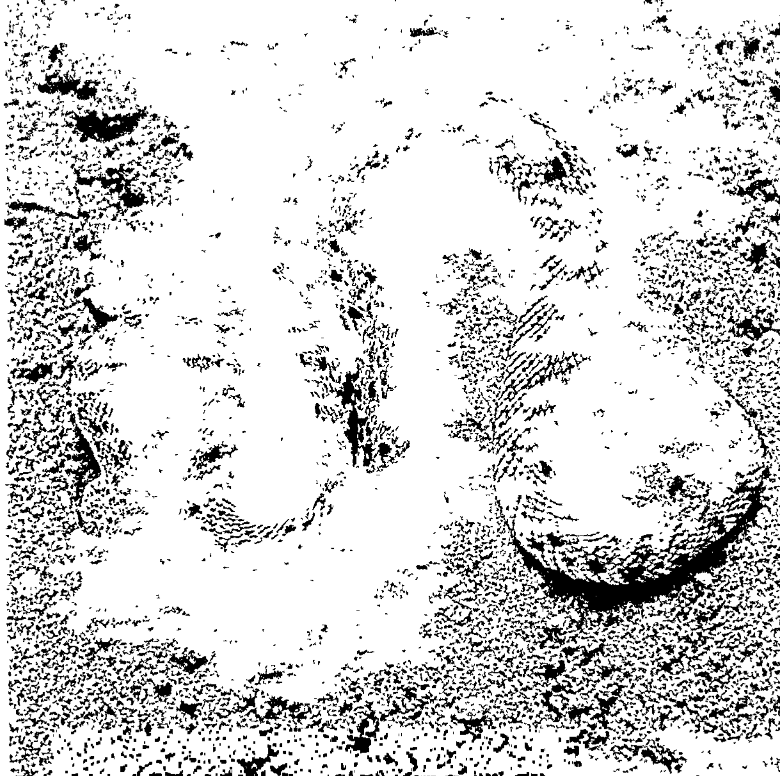
As some other species, the Prairie Rattlesnake, when striking, lifts the anterior part of its body to a considerable height, coiling it into a loop to be ready to dart forward at any moment to strike the intruder. Its black, long, forked tongue flashes from time to time from its closed mouth like a shining flame, flicks searchingly through the air and disappears again into its enclosure. In this way the snake probes its immediate surroundings, thus compensating for its lack of some senses known to man, such as hearing, with others not possessed by humans



South Arizona, West Texas and North Mexico are the habitat of the small Blue Rattlesnake, *Crotalus lepidus*. It is usually a little shorter than one and a half feet, its pastel colours being olive-green, greyish-green or greyish-pink, with narrow, dark, transverse stripes. It is found on the stony slopes of rocky regions.



The rattlesnakes are viviparous, their young being of the size of more grown-up vipers. The Texas Rattlesnake or Western Diamond Rattlesnake, *Crotalus atrox*, throws about ten young, a grown specimen attaining as much as six feet in length.



In the deserts of Arizona, California and Nevada there lives the Horned Rattlesnake or Sidewinder, *Crotalus cerastes*, which attains a length of a little over one and a half feet. It is light greyish-brown in colour and has a low but sharp-edged horn over each eye. The movement of this snake is very interesting. It does not glide straight forwards, but obliquely sideways by means of coiling and uncoiling the loops of its body, thus sliding along dry sand from one place to another. This manner of motion has obviously developed in all species of snakes living in sand due to the necessity of adapting themselves to their surroundings which do not offer any solid support for their forward movement.



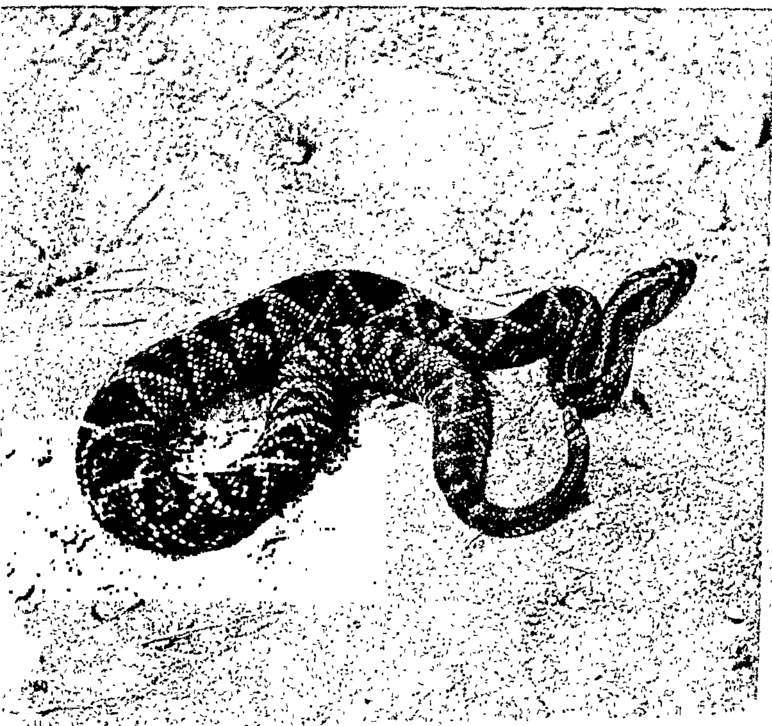
The Horned Rattlesnake feeds not only on small desert vertebrates, but also on large insects, such as locusts, etc. Its head is flat and broad, widened in front by means of two horns formed by horn-like scales On the other hand, its neck is relatively narrow, which is actually a characteristic of all rattlesnakes, distinguishing them from viperine snakes, which have a thick neck.

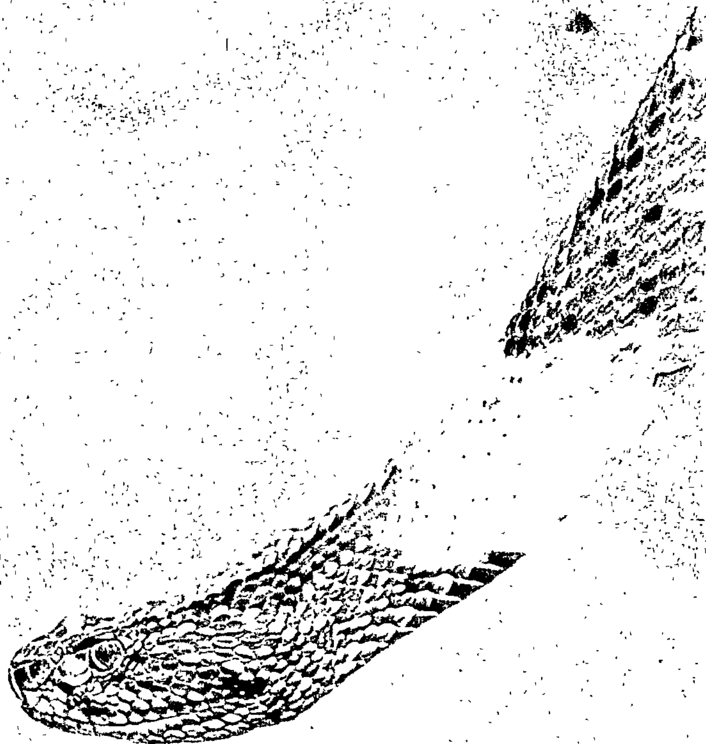


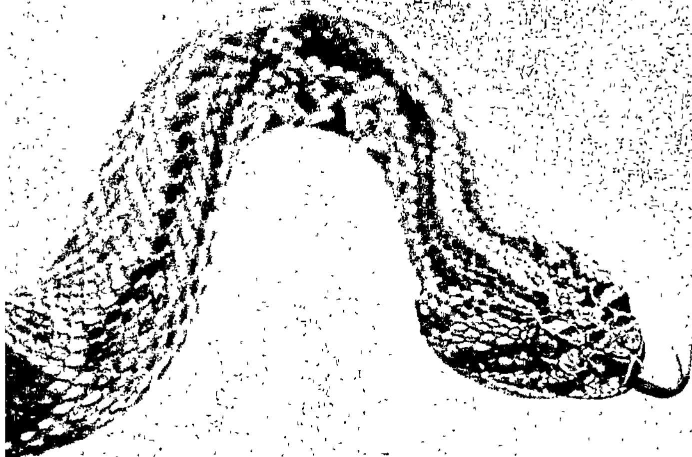
The only species of crotaline snakes living in South America is the Brazilian Rattlesnake, *Crotalus durissus*, known by the much dreaded name of Cascavela.

The Cascavela has a comparatively rich pattern consisting of golden-yellow and greenish coloured patches on a base of various shades of brown to brownish-black. At the most it attains a length of four and a half feet and is generally of a non-aggressive nature. If it does bite, however, the consequences — if expert assistance is not available — are deadly in the majority of cases. Its venom is much more effective than that of other South American snakes. When on guard, the Cascavela's front part is folded into the well known S shape from which the snake can strike like lightning to kill.

Between the eyes and nostrils of all crotaline snakes (Pit Vipers) a deep, clearly visible pit is situated on either side of their heads. In this pit certain nerves terminate, the ends being very sensitive to warmth. These organs assist the snake in the detection of its prey — warm-blooded animals.







The Cascavels continuously explores its nearest surroundings with its agile, forked tongue. The rattle of the rattlesnake consists of membranous rings which are formed gradually at the time it sheds its skin. However, the snake rejects its rattle from time to time, so that the number of its rings cannot serve as a guide in determining either the number of times it has shed its skin, or its age



In some countries of South America the typical Cascavela is represented by one of its subspecies, *Crotalus durissimus terrificus*. Its mode of life and venomousness are the same as those of the original species. Only its pattern, particularly behind its head, is not so distinct. This snake is a nocturnal creature living in dry places. Guided by its special sense of discerning temperature, it crawls noiselessly after its prey. Its venom is most effective when used on birds, paralysing them quickly, so that they cannot escape their pursuer. The snake usually holds the bitten bird in its jaws until the venom causes paralysis. In the case of mammals, the snake usually strikes with its jaws wide open, biting its prey with its erect fangs and recoiling. Later on, aided by the sensory organs in its pits and its sensitive tongue, it seeks its paralysed prey, which usually cannot escape very far. First it glides around the bitten creature, feeling it with the tips of its forked tongue, distending its jaws, and preparing its swallowing apparatus for action.

The prey is usually seized by the head, and by alternate movements of its distended jaws, the snake shifts it slowly into its throat. Both halves of the lower jaw extend, the skin and the ligament connecting them stretch, and the prey, often much wider than the snake's head itself, slowly glides along a wet mucous membrane into the throat.

The snakes have no attachment in their mouths enabling them to chew their food, thus being obliged to swallow their prey whole. This action is aided by several rows of small teeth in the upper palate, which are inclined backwards to serve their purpose better. It does not take long, and a 'mouthful', however big, gradually disappears in the snake's digestive system, where strong, effective acids immediately start the dissolving and digesting process.

In the last phase of swallowing only a leg or tail can be seen sticking out of the snake's mouth, and even this finally glides into the throat. Thus the victim disappears completely from the world and the contented snake can devote some time to the lengthy process of digestion.

Snakes like to eat and drink fairly often. If necessary, however, they can go hungry for several months on end, this being, of course, detrimental to their bodily strength. Sometimes, on being transferred to better conditions, such a weakened reptile regains its balance and begins to take food again. More often, however, its fate is settled by its not having enough strength or interest to remain alive



When exploring its immediate surroundings the snake usually takes stock of them with its forked tongue which it sticks out and withdraws through a slit between its closed jaws. On withdrawing its tongue, the snake puts both of its tips into the small openings of its so-called Jacobson's organ, thus getting an idea of what the tongue has just touched or approached.

Both pictures show the head of a Water Moccasin in the process of exploring its surroundings

When a snake opens its mouth, the fangs in its upper jaw can be seen more or less distinctly. *Under normal circumstances they* are tilted backwards and hidden in the folds of the mucous membrane, only their tips being sometimes visible. When the snake is ready to strike, however, both fangs stand erect and perpendicular to the jaw, sometimes even being inclined slightly forwards. When striking, the snake stabs its prey with them by means of hitting with its wide open mouth.

On the clean snake's skull the fangs, as well as the relation of their size to the dimensions of the other parts of the head can be seen clearly. The photograph shows a picture of the skull of the African Rhinoceros Viper, *Bitis Nasicornis*, enlarged about three times.

At the top the opening in the fang is shown with which the canal leading from the venom gland terminates. At the pointed end of the hollow fang there is another slit-like opening through which the venom is discharged from the fang into the wound. The opening is not situated at the very tip of the fang and thus does not reduce its effective sharpness.

The relation of present-day man towards venomous snakes is expressed in these two pictures In the top one a young man is holding the ill-famed Cascavela, while the bottom picture shows the mythical Cobra in the hands of a young girl. Today man studies the life of snakes, the build of their bodies and the composition of their venom, endeavouring to master and render harmless these dangerous fellow-creatures

The snake dreaded by the whole Orient, the Tic-Polonga, shows the length of its fangs. By means of a steel bar it is possible to shift the fangs of a live snake into an erect position, free them from their protective mucous folds and examine their discharge openings. Every venomous snake can be held in the hand; this, of course, requires courage, calm, and cautious skill and care, if a rare specimen is not to be injured

The so-called 'milking' of a snake. A fully grown Water Moccasin specimen does not part willingly with its venom. A glass bowl slid suddenly to the snake's mouth provokes the reptile to open its jaws and strike like a flash of lightning against the apparent enemy. The grinding of its teeth on the glass can be heard and down the wall of the bowl its venom flows slowly, like thick oil.

It is known that snake-bite victims can nowadays be saved if a serum prepared from the blood of a horse accustomed to the venom of a certain type of snake and in which appropriate antibodies have formed as a result, is injected in good time. It is of the utmost importance, of course, that the correct serum be administered, the one appropriate for the venom of the snake in question. This is sometimes very difficult in the tropics, where hundreds of the most varied snakes are found. The venoms of all snakes do not have the same effect. Some cause decomposition of the blood, others cause it to clot, some produce shock, or paralyse the nervous system. Some pharmacological institutions produce a universal, so-called polyvalent, serum, which is supposed to be effective in all cases of snake-bite. It is always better, however, to inject a serum corresponding to a certain type of venom, or at least to a group of venoms with common symptoms of effect.

The taking of venom from a snake is not without danger. A sudden flashing movement of the snake's head sideways and an attempt to hit with at least one fang some of the fingers of the person holding it is its usual reaction. After the snake has calmed down again, there follows a mild pressure of the fingers on the venom glands and another dose of venom flows down the glass wall of the bowl. At the bottom of the vessel there is just over one cubic centimetre of precious liquid, a quantity capable of killing several dozen, sometimes even hundreds of people.

Snake venom has various colours, ranging from pale yellow, honey colour, transparent and white to greenish-yellow, the colour depending on the kind of snake from which it is taken. After desiccation and evaporation, it forms a solid substance similar to lustrous crystals or crushed amber, and can be preserved for any length of time. In the picture there can be seen the venom of the Sand Natter collected over a period of several months. The small bottle holds a quantity of venom able to destroy the lives of many hundreds of people.

In the hands of clever experts even deadly venoms are utilised for the benefit of mankind. From many of them medicines are produced today which assist people to regain their health. The effects of suitably processed venoms are very varied: some kill pain, others can be used for local anaesthesia, some types stop bleeding, cause the blood to clot, or are used as a means against clotting, while still others decrease the blood pressure, and so on. All these properties can be utilised in medicine.

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